according to a predetermined factor based on an object's proximity to the panel according to embodiments of the invention.

[0017] FIGS. **8***a*, **8***b*, **8***c*, **8***d*, and **8***e* are exemplary illustrations of a sensor panel having dynamically reconfigurable sensor size and shape according to a predetermined factor based on an object's proximity to the panel according to embodiments of the invention.

[0018] FIG. **9** illustrates an exemplary method for dynamically reconfiguring sensor size and shape of a sensor panel based on a gesture detected by the panel according to embodiments of the invention.

[0019] FIGS. **10***a* and **10***b* are exemplary illustrations of a sensor panel having dynamically reconfigurable sensor size and shape based on a gesture detected by the panel according to embodiments of the invention.

[0020] FIG. **11** illustrates an exemplary method for dynamically reconfiguring sensor size and shape of a sensor panel based on an application according to embodiments of the invention.

[0021] FIGS. **12***a*, **12***b*, and **12***c* are exemplary illustrations of a sensor panel having dynamically reconfigurable sensor size and shape based on an application according to embodiments of the invention.

[0022] FIG. **13***a* illustrates an exemplary mobile telephone having a sensor panel that dynamically reconfigures sensor size and shape according to embodiments of the invention.

[0023] FIG. **13***b* illustrates an exemplary media player having a sensor panel that dynamically reconfigures sensor size and shape according to embodiments of the invention.

[0024] FIG. **13***c* illustrates an exemplary computer having a sensor panel that dynamically reconfigures sensor size and shape according to embodiments of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0025] In the following description of preferred embodiments, reference is made to the accompanying drawings which form a part hereof, and in which it is shown by way of illustration specific embodiments in which the invention may be practiced. It is to be understood that other embodiments may be utilized and structural changes may be made without departing from the scope of the preferred embodiments of the invention.

[0026] This relates to multi-touch, single-touch and proximity capacitive sensor panels having dynamically reconfigurable sensor size and shape for proximity and/or distance to enable hover and gesture detection. The sensor panel can be dynamically configured to vary its sensor size and shape and enable the detection of non-contact proximity (or hover) events and gestures at various distances from the sensor panel. This capability can provide a new suite of non-contact gestures and features for enhanced user interaction.

[0027] Although embodiments of this invention may be described herein primarily in terms of devices utilizing mutual capacitance based multi-touch technologies, it should be understood that the invention is not limited to such devices, but is generally applicable to devices utilizing other touch and proximity sensing technologies as well, including but not limited to self capacitance sensing.

[0028] FIG. **1** illustrates exemplary computing system **100** that can include one or more of the embodiments of the invention described herein. Computing system **100** can include one or more panel processors **102** and peripherals **104**, and panel subsystem **106**. Peripherals **104** can include, but are not limited to, random access memory (RAM) or other types of memory or storage, watchdog timers and the like. Panel subsystem **106** can include, but is not limited to, one or more sense channels **108**, channel scan logic **10** and driver logic **114**. Channel scan logic **110** can access RAM **112**, autonomously read data from the sense channels and provide control for the sense channels. In addition, channel scan logic **110** can control driver logic **114** to generate stimulation signals **116** at various frequencies and phases that can be selectively applied to drive lines of touch sensor panel **124**. In some embodiments, panel subsystem **106**, panel processor **102** and peripherals **104** can be integrated into a single application specific integrated circuit (ASIC).

[0029] Touch sensor panel **124** can include a capacitive sensing medium having a plurality of drive lines and a plurality of sense lines, although other sensing media can also be used. Either or both of the drive and sense lines can be used to provide dynamically reconfigurable sensor size and shape of touch sensor panel **124** according to embodiments of the invention. Each intersection of drive and sense lines can represent a capacitive sensing node and can be viewed as picture element (pixel) **126**, which can be particularly useful when touch sensor panel **124** is viewed as capturing an "image" of touch. (In other words, after panel subsystem **106** has determined whether a touch event has been detected at each touch sensor in the touch sensor panel, the pattern of touch sensors in the multi-touch panel at which a touch event occurred can be viewed as an "image" of touch (e.g. a pattern of fingers touching the panel).) Each sense line of touch sensor panel **124** can drive sense channel **108** in panel subsystem **106**.

[0030] Computing system **100** can also include host processor **128** for receiving outputs from panel processor **102** and performing actions based on the outputs that can include, but are not limited to, moving an object such as a cursor or pointer, scrolling or panning, adjusting control settings, opening a file or document, viewing a menu, making a selection, executing instructions, operating a peripheral device coupled to the host device, answering a telephone call, placing a telephone call, terminating a telephone call, changing the volume or audio settings, storing information related to telephone communications such as addresses, frequently dialed numbers, received calls, missed calls, logging onto a computer or a computer network, permitting authorized individuals access to restricted areas of the computer or computer network, loading a user profile associated with a user's preferred arrangement of the computer desktop, permitting access to web content, launching a particular program, encrypting or decoding a message, and/or the like. Host processor **128** can also perform additional functions that may not be related to panel processing, and can be coupled to program storage **132** and display device **130** such as an LCD display for providing a UI to a user of the device. Display device **130** together with touch sensor panel **124**, when located partially or entirely under the touch sensor panel, can form touch screen **118**.

[0031] Note that one or more of the functions described above can be performed by firmware stored in memory (e.g. one of the peripherals **104** in FIG. **1**) and executed by panel processor **102**, or stored in program storage **132** and executed by host processor **128**. The firmware can also be stored and/or transported within any computer-readable medium for use by or in connection with an instruction execution system, apparatus, or device, such as a computer-based system, processor-